ward through a window about 10 feet from the eye, up a long, wide, flat valley, running northerly and southerly between two ranges of the Balsam Mountains. The air current, at a height of about 4,000 feet, was from a westerly direction, and a continuous procession of small cumuli was floating across the field of view, projected upon the window panes, which afforded an excellent opportunity for observing both the progressive and the proper motion of the clouds.

It was first noticed that one of the cumuli was fast changing in shape, and that its summit was continually falling and being replaced by another summit rising from behind. As that cloud drifted out of the field of view and others came in sight, they were all seen to be changing in the same manner. Then it was noticed that the entire fronts of the clouds were falling and their rear portions rising; next that the horizontal, easterly motion of the tops of the clouds across the window panes was much more rapid than the vertical motions of the fronts and rears, and finally that the lower edges were nearly stationary.

Then it was perceived that all these apparent motions were the resultant of the progressive motion of the clouds, and a motion of gyration round an axis. There was not sufficient vertical motion of any cloud, as a whole, to be noticeable, and it was obvious that the axis was within the cloud, and that each cloud substantially filled a cross section of a horizontal air roll which was "end on" to the observer. The gyratory velocity was moderate, and on the first day it was several minutes before all the motions mentioned had been noticed and correlated in the mind. The period of observation lasted about half an hour, and as the progressive motion was tolerably brisk (from 15 to 20 miles an hour probably) and as several clouds were constantly within the field of view, hundreds of them must have been seen. No cloud was observed that did not have the gyratory motion.

On going out of doors to ascertain how far the field of rolls extended, it was seen that the clouds in the whirls were all to leeward of a large, standing, nocturnal cloud, hanging over "Platt's Balsam," the summit of which is 6,500 feet above sea level, and 3,800 feet above the floor of the valley, and that they all evaporated before reaching the high range of mountains on the other side of the valley. The clouds observed through the window were at least two miles from the standing cloud.

The coincidence in size of the clouds and the cross sections of the rolls seemed at first thought to indicate that the whirls were effective in condensing the clouds, but the better opinion seemed to be that these rolls, while drifting over the Balsam Mountains, tore off from the standing cloud as much as they could contain in cross section, and carried it along rolling over and over as described.

Possibly the air rolls themselves were formed at the ridge of the "Balsams," where the standing cloud was formed. A half hour's observation on the second occasion under identical circumstances, as far as could be perceived, verified the observations above described. The weather was fair and no other clouds were visible. Similar standing clouds at the same place, with fragments blown away to leeward, were frequently seen afterward, but no revolving clouds were seen at any other time.

The similiarity in size, shape, and motion of the clouds indicated a succession of parallel, horizontal air rolls of tolerably uniform dimensions following one another closely. The clouds were all considerably south of the zenith, and nothing could be seen of the longitudinal dimensions of the rolls.

## LONG RANGE SEASONAL PREDICTIONS FOR OREGON.

By B. S. PAGUE, Local Forecast Official.

In the REVIEW for March, page 166, we called attention to the general prediction of summer weather made by Mr. B. S. Pague, Local Forecast Official at Portland, Oreg. We now reprint from the Weather Map for 8 a. m. eastern time, or 5 a. m. Pacific time, October 29, 1896, published at the Weather Bureau station at Portland, Oreg., the following synopsis and general forecast, indicating the approach of the winter season:

### WEATHER SYNOPSIS AND GENERAL FORECASTS.

The first winter storm of the season has made its appearance, and from now until the summer type appears in the spring of 1897, it is more probable that rain will fall than that fair weather will prevail. In 1895 the first winter type of storms appeared on November 12 and continued to prevail until June 13, 1896, when the summer type appeared. The winter is distinguished from the summer by the movement of the high and low areas; in the winter type the lows move from the north southward along the coast line to Vancouver Island, or lower, thence eastward; while the low is moving in this way the high pressure areas move from the ocean on the southwest of California to about Cape Mendocino, thence eastward to about Great Salt Lake, where they remain stationary and gradually dissipate. In the summer type the low areas move eastward about the latitude of Sitka and the areas of high pressure move northward to about the latitude of Vancouver Island, thence eastward; when they reach the summit of the Rocky Mountains, northeast of Spokane, then very warm weather prevails; when the highs are moving along the coast cooler weather prevails. In winter warmer weather, caused by dynamic heating, prevails when the highs are central about Great Salt Lake. The areas of low pressure follow each other in quick succession, and the more rapid their appearance the more frequent the rain. Continuous rain is not the idea, but rather the summer or dry season is past, and the winter or rainy season is present.

## NOTES CONCERNING THE WEST INDIA HURRICANE OF SEPTEMBER 29-30, 1896.

By A. J. HENRY, Chief of Division of Records and Meteorological Data (dated November 10).

[CONTINUED FROM THE SEPTEMBER REVIEW.]

As stated in the September REVIEW (page 317 of this volume), the violence of the storm of the above date was not uniform throughout its entire course. There seems to have been two distinct periods of unusual violence separated by a period during the afternoon of the 29th when the winds exhibited but little destructive power.

Evidences of unusually violent winds were observed on every hand throughout the storm's course in the States of Florida and Georgia. In the counties of Levy, Alachua, Lafayette, Suwannee, Columbia, Bradford, and Baker, Fla., the destruction of pine timber was enormous, the monetary loss from that source alone being estimated at $1,500,000. During the early part of the storm the trees were torn up by the roots, but as the force of the wind increased they were broken and twisted off and thrown forward in a confused mass.

At Jacksonville, a little south and east of the storm's path, the self-registers show the maximum wind velocity, 70 miles per hour, to have occurred coincidently with the minimum of pressure. Violent winds continued for an hour and a half after the occurrence of the barometric minimum. The average velocity during the continuance of the storm, or from 9.10 a. m. to 12 noon, was 52 miles per hour, rising during a portion of the time to 63 miles, which velocity was maintained continuously for an hour.

The self-registers at Savannah indicate quite clearly that that city was in or very near the center of the storm's path. The barograph curve is exceedingly interesting. It is of the V-type characteristic of thunderstorms and tornadoes. The fall was quite slow at first but increased rapidly as the center of the disturbance approached. The fall from noon to 12.45 p. m. was .45 inch, almost all of which had been recovered by 2 p. m. Unfortunately the electrical recording apparatus of the anemometer was disabled at about 12.15 p. m., and the highest velocity can not therefore be obtained. The average velocity during the 28 minutes the recording apparatus failed to register was 75 miles per hour, a velocity